

AMENDED CLAIMS

[Received by the International Bureau on 29 December 2004 (29.12.2004): original claims 1-45 have been replaced by amended claims 1-45].

1. Apparatus for generating a precursor for a semiconductor processing system, comprising:
 - a canister defining an interior volume having an upper region and a lower region;
 - a precursor material is at least partially disposed in the lower region of the canister; and
 - at least one silo extending from the lower region of the canister to the upper region.
2. The apparatus of claim 1, wherein the at least one silo is a fin or a post.
3. The apparatus of claim 2, wherein the at least one silo comprises a heat-conducting material.
4. The apparatus of claim 3, wherein the heat-conducting material is selected from the group consisting of aluminum, stainless steel and combinations thereof.
5. The apparatus of claim 4, wherein there are at least three silos extending from the bottom of the canister.
6. The apparatus of claim 2, wherein a gas flow inlet tube is adapted to create a non-linear flow of gas into the upper region of the canister.
7. The apparatus of claim 6, wherein the non-linear flow is adapted to create an increased saturation level of the gas in the upper region of the canister.
8. The apparatus of claim 7, wherein the gas flow inlet tube extends from the upper region of the canister to a lower region of the canister.

9. The apparatus of claim 6, wherein the gas flow inlet tube comprises a restriction.
10. The apparatus of claim 9, wherein the gas flow inlet tube comprises at least one opening anterior to the restriction.
11. The apparatus of claim 10, wherein the at least one opening is adapted to provide a non-linear flow of gas into the upper region of the canister.
12. The apparatus of claim 2, wherein the precursor material comprises tantalum.
13. The apparatus of claim 12, wherein the precursor material comprises pentakis(dimethylamido)tantalum having a chlorine concentration of about 5 ppm or less.
14. Apparatus for generating a precursor for a semiconductor processing system, comprising:
 - a canister defining an interior volume having an upper region and a lower region; and
 - a tantalum precursor material having a chlorine concentration of about 5 ppm or less at least partially disposed in the lower region of the canister.
15. The apparatus of claim 14, wherein the tantalum precursor material comprises pentakis(dimethylamido)tantalum.
16. The apparatus of claim 14, wherein at least one silo extends from a bottom of the canister in the lower region to the upper region.
17. The apparatus of claim 16, wherein the at least one silo is a fin or a post.

18. The apparatus of claim 17, wherein the at least one silo comprises a heat-conducting material.
19. The apparatus of claim 18, wherein the heat-conducting material is selected from the group consisting of aluminum, stainless steel and combinations thereof.
20. The apparatus of claim 19, wherein there are at least three silos extending from the bottom of the canister.
21. The apparatus of claim 16, wherein a gas flow inlet tube is adapted to create a non-linear flow of gas into the upper region of the canister.
22. The apparatus of claim 21, wherein the non-linear flow is adapted to create an increased saturation level of the gas in the upper region of the canister.
23. The apparatus of claim 22, wherein the gas flow inlet tube extends from the upper region of the canister to a lower region of the canister.
24. The apparatus of claim 21, wherein the gas flow inlet tube comprises a restriction.
25. The apparatus of claim 24, wherein the gas flow inlet tube comprises at least one opening anterior to the restriction.
26. The apparatus of claim 25, wherein the at least one opening is adapted to provide a non-linear flow of gas into the upper region of the canister.
27. Apparatus for generating a precursor for a semiconductor processing system, comprising:

a canister defining an interior volume having an upper region and a lower region;
a precursor material at least partially filling the lower region of the canister;
and
a gas flow inlet tube adapted to inject a carrier gas into the canister in a direction away from the precursor material.

28. The apparatus of claim 27, wherein the gas flow inlet tube is adapted to create a non-linear flow of gas into the upper region of the canister.

29. The apparatus of claim 28, wherein the non-linear flow is adapted to create an increased saturation level of the gas in the upper region of the canister.

30. The apparatus of claim 27, wherein the gas flow inlet tube extends from the upper region of the canister to a lower region of the canister.

31. The apparatus of claim 30, wherein the gas flow inlet tube is adapted to provide a first flow of gas into the upper region of the canister.

32. The apparatus of claim 30, wherein the gas flow inlet tube is adapted to provide a second flow of gas to the lower region of the canister.

33. The apparatus of claim 30, wherein the gas flow inlet tube comprises a restriction.

34. The apparatus of claim 33, wherein the gas flow inlet tube comprises at least one opening anterior to the restriction.

35. The apparatus of claim 35, wherein the at least one opening is adapted to provide a non-linear flow of gas into the upper region of the canister.

36. The apparatus of claim 32, wherein the second flow of gas to the lower region is adapted to maintain a suspension of the precursor materials.

37. The apparatus of claim 31, wherein the first flow of gas is adapted to maintain an overall gas flow volume.

38. The apparatus of claim 27, wherein the precursor material comprises tantalum.

39. The apparatus of claim 38, wherein the precursor material comprises pentakis(dimethylamido)tantalum having a chlorine concentration of about 5 ppm or less.

40. Apparatus for generating a precursor for a semiconductor processing system, comprising:

a canister having a sidewall, a top portion and a bottom portion, wherein the canister defines an interior volume having an upper region and a lower region; and

at least one silo extending from the upper region to the lower region.

41. The apparatus of claim 40, wherein the at least one silo is a fin or a post.

42. The apparatus of claim 41, wherein the at least one silo comprises a heat-conducting material selected from the group consisting of aluminum, stainless steel and combinations thereof.

43. The apparatus of claim 40, wherein a precursor material is at least partially disposed in the lower region of the canister.

44. The apparatus of claim 43, wherein the precursor material comprises tantalum.

45. The apparatus of claim 44, wherein the precursor material comprises pentakis(dimethylamido)tantalum having a chlorine concentration of about 5 ppm or less.